FARM & GROUNDWATER TOPIC MEETING DATA

Introduction

The Kettle River & Upper St. Croix Watershed flows south from its headwaters in Carlton County to its confluence with the Snake River just south of St. Croix State Park. Although largely forested, the watershed is dotted with farmland and small cities including Moose Lake, Sandstone and Hinckley. This watershed is lucky to have abundant healthy natural resources including rivers, streams, lakes, wetlands, groundwater and forests.

The **Kettle River & Upper St. Croix One Watershed, One Plan** (1W1P) is a planning partnership between Pine SWCD, Pine County, Carlton SWCD, Carlton County and Kanabec SWCD. The goal of this partnership is to **prioritize** restoration and protection opportunities and **target** valuable resources. The result will be the development of a comprehensive watershed management plan with actions that make progress towards **measurable** goals.

The general 1W1P process is outlined in Figure 1. For the first step, which is to gather and prioritize opportunities/issues in the watershed, a series of five topic meetings will be held. The meeting topics include: 1) lakes, 2) forests, 3) rivers, streams & wetlands, 4) agriculture & groundwater and 5) stormwater.

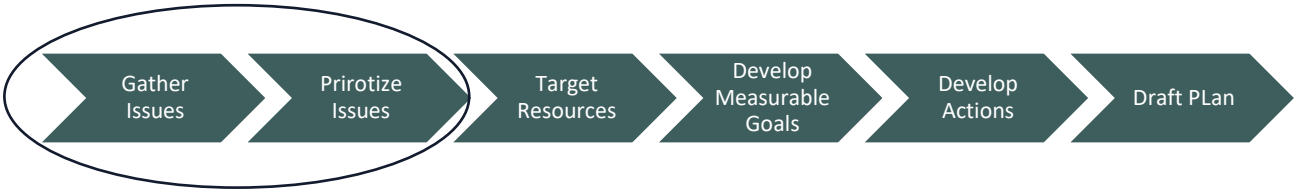

Figure 1. The 1W1P process is divided into six main steps. The topic meetings are the first step in the process (circled).

The 1W1P process is driven by local units of government, guided by an Advisory Committee made up of local stakeholders and state agencies. The decision-making body for the plan is a Policy Committee made up of elected officials from each County and SWCD.

Kettle River & Upper St. Croix Watershed Farms

Compared to other parts of the state, farming is a relatively small land use type in this watershed, but farms are an important part of the watershed's communities and economy. According to USDA statistics, there are approximately 800 farms with 160,000 acres of farmland earning $1.5 million dollars of gross income. Most farms are hay/pasture and/or animal operations. The Minnesota Pollution Control Agency (MPCA) regulates feedlots. Feedlots are designated by number of animal units and proximity to a shoreland area. There are about 77 registered feedlots (farms with 50 or more animal units or 10 or more animal units in a shoreland area), with the highest number being in the Upper Kettle River Subwatershed. There are over 27,000 animal units in registered feedlots, with the Pine River subwatershed having the highest number of animal units. There are also an unknown number of animal units in small, unregistered animal operations. The southern portion of the Kettle River Watershed has the highest amount of cropland.

Figure 2. A variety of farm operations are present in the watershed including livestock, dairy and crops.

Best management practices help protect lakes and streams, while also protecting animal health. Many farms in the watershed are already implementing practices that protect water quality. However, the Minnesota Pollution Control Agency has listed 7 streams as impaired for *E. coli* bacteria. This bacterium is an indicator of fecal material in surface waters. Based on proximity of animal operations to steams, farms were listed as a possible source along with septic systems.

Kettle River & Upper St. Croix Watershed Groundwater

According to the Minnesota Department of Health, all drinking water users get their water from groundwater supplies, whether their water comes from private wells or public water supplies. Groundwater supplies are protected from contamination by the soil above it, and different soils provide different levels of protection. Generally, course textured soils like sand and gravel offer less protection than soils with high amounts of clay. Of special interest, karst geology has the highest risk of contamination because pores in the soils allow contaminants to flow directly to groundwater supplies. The Kettle River & Upper St. Croix Watershed has examples of all these soil types.

Figure 3. Groundwater is the main source of drinking water in the Kettle River & Upper St. Croix Watershed.

The Lower Kettle River Subwatershed has the most acres of karst areas and vulnerable groundwater. The Lower Kettle River Subwatershed also has the largest Drinking Water Supply Management Area (Hinkley). According to the MN Department of Health, Moose Lake and Sturgeon Lake have the highest potential to contamination risk due to surface water sources and/or connection with surface water.

HUC -10 Watershed	Percent Hay/Pastureland (WRAPS)	Percent Cropland (WRAPS)	Registered Feedlots (MPCA)	Animal Units (MPCA)*
Upper Kettle River	12%	1%	30	2,809
Moose River	13%	1%	11	381
Willow River	10%	1%	9	313
Pine River	15%	2%	19	15,036
Grindstone River	25%	4%	15	1,437
Lower Kettle River	16%	4%	12	1,235
Bear Creek	20%	4%	9	1,066
Sand Creek	12%	4%	12	1,468
Crooked Creek	9%	3%	12	3,287
Lower Tamarack	2%	<1%	0	0
Upper Tamarack	5%	2%	0	0
Chases Brook – St. Croix	1.1%	<1%	0	0

*Number of total animal units on the premise/feedlot. An animal unit is a measure used to compare differences in the production of manure for an animal feedlot or manure storage area. Different animal unit calculation factors are applied based on the species and size of an animal.

HUC -10 Watershed	Wellhead Protection Areas (WRAPS)	Karst Areas Acres (WRAPS)	Drinking Water Supply Management Areas (WRAPS)	Vulnerable Groundwater Acres (WRAPS)
Upper Kettle River	• Kettle River (34 acres)	0	• Kettle River (120 acres)	20,621
Moose River	• Barnum (41 acres) • Moose Lake (1370 acres) • Minnesota Correctional Facility, Moose Lake (216 acres) • Sturgeon Lake (208 acres) • Sun Bay Mobile Home Park & Campground (89 acres)	0	• Minnesota Correctional Facility, Moose Lake (436 acres) • Sturgeon Lake (208 acres) • Moose Lake (1870 acres) • Barnum (92 acres) • Sun Mobile Home Park & Campground (243 acres)	34,470
Willow River	• Willow River (8 acres)	23,313	• Willow River (33 acres)	37,297
Pine River	• Finlayson (160 acres)	12,967	• Finlayson (501 acres)	27,933
Grindstone River	• Hinkley (445 acres)	13,437	• Hinkley (855 acres)	28,520
Lower Kettle River	• Willow River (6 acres) • Hinkley (141 acres)	53,843	• Willow River (11 acres) • Hinkley (8242 acres)	67,508
Bear Creek	• Askov (297 acres)	11,522	• Askov (589 acres)	12,161
Sand Creek	• Askov (148 acres)	21,165	• Askov (266 acres)	23,012
Crooked Creek	None	0	None	0
Lower Tamarack	None	0	None	0
Upper Tamarack	None	0	None	0
Chases Brook – St. Croix	None	0	None	0

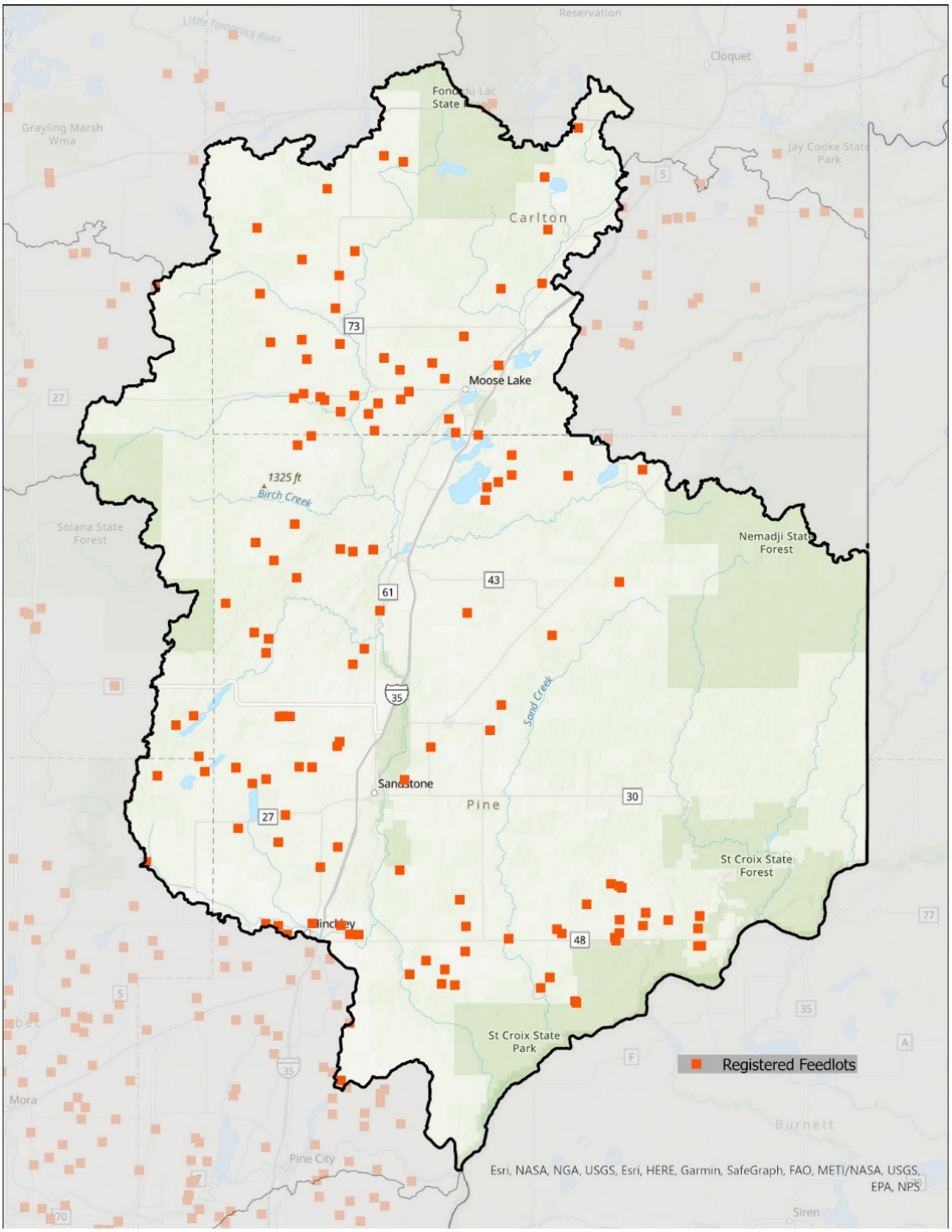

Figure 4. Registered feedlots in the Kettle River & Upper St. Croix Watershed (MPCA Dataset)

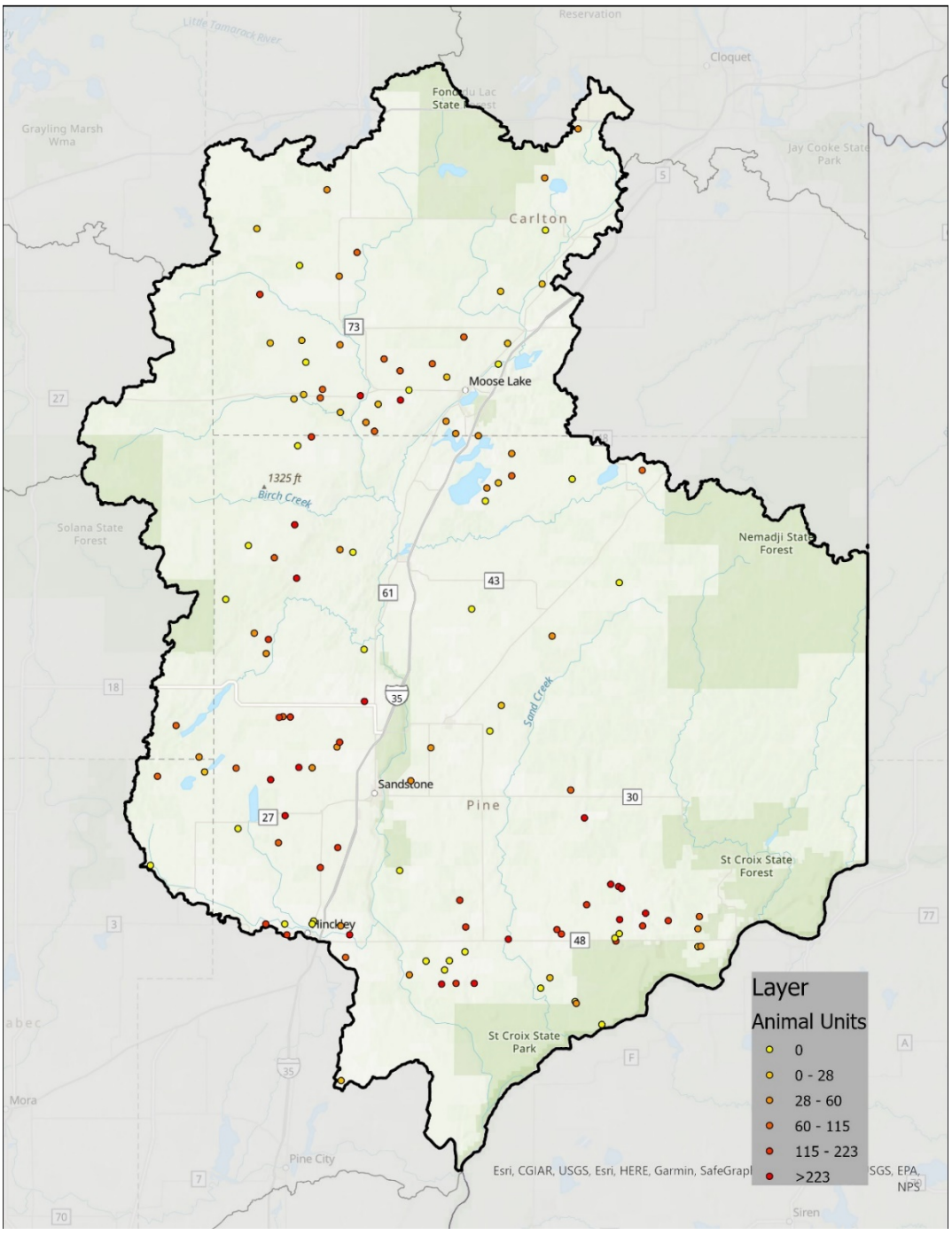

Figure 5. Number of total animal units on the premise/feedlot. An animal unit is a measure used to compare differences in the production of manure for an animal feedlot or manure storage area. Different animal unit calculation factors are applied base on the species and size of an animal. MPCA Dataset.

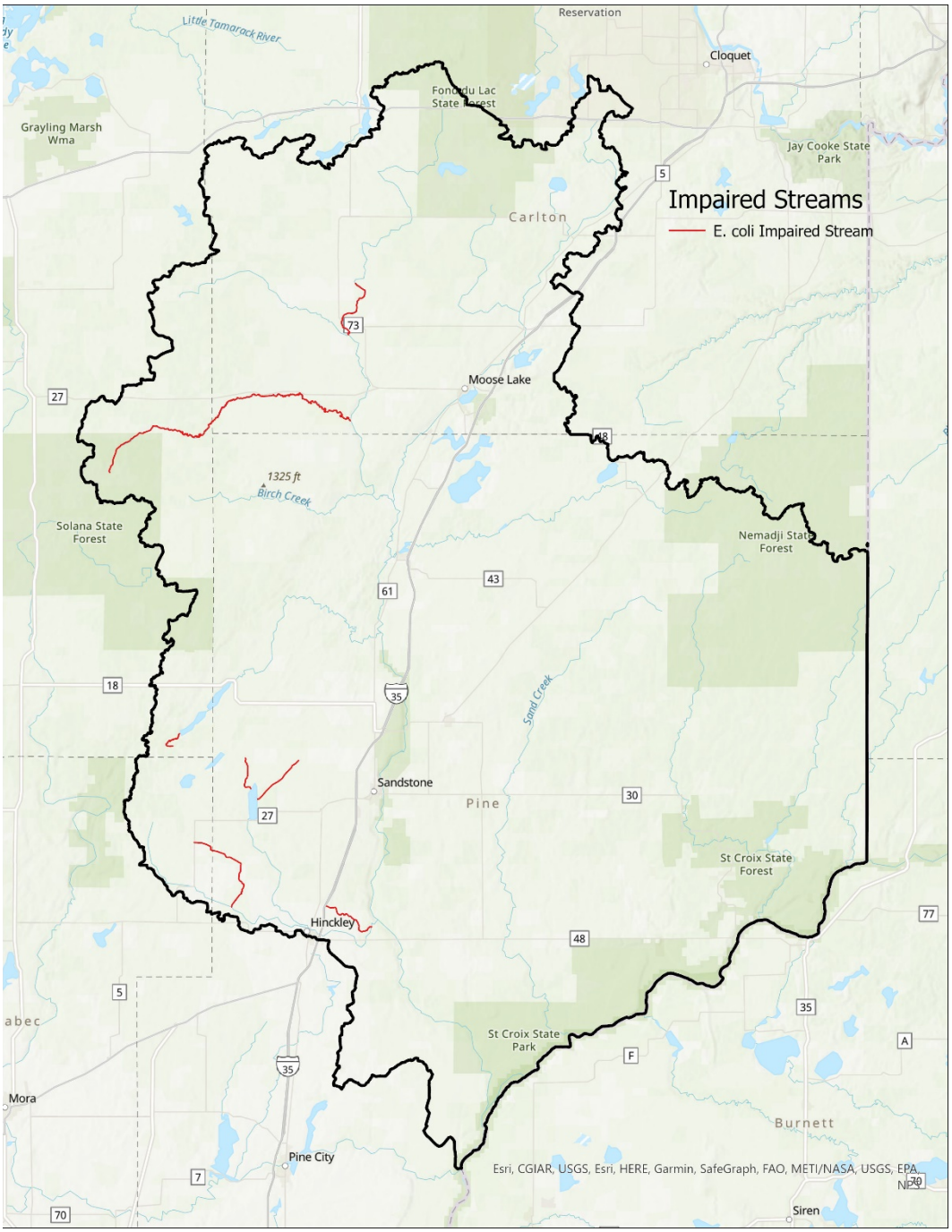

Figure 6. *E. coli* impaired streams in the Kettle River & Upper St. Croix Watershed.

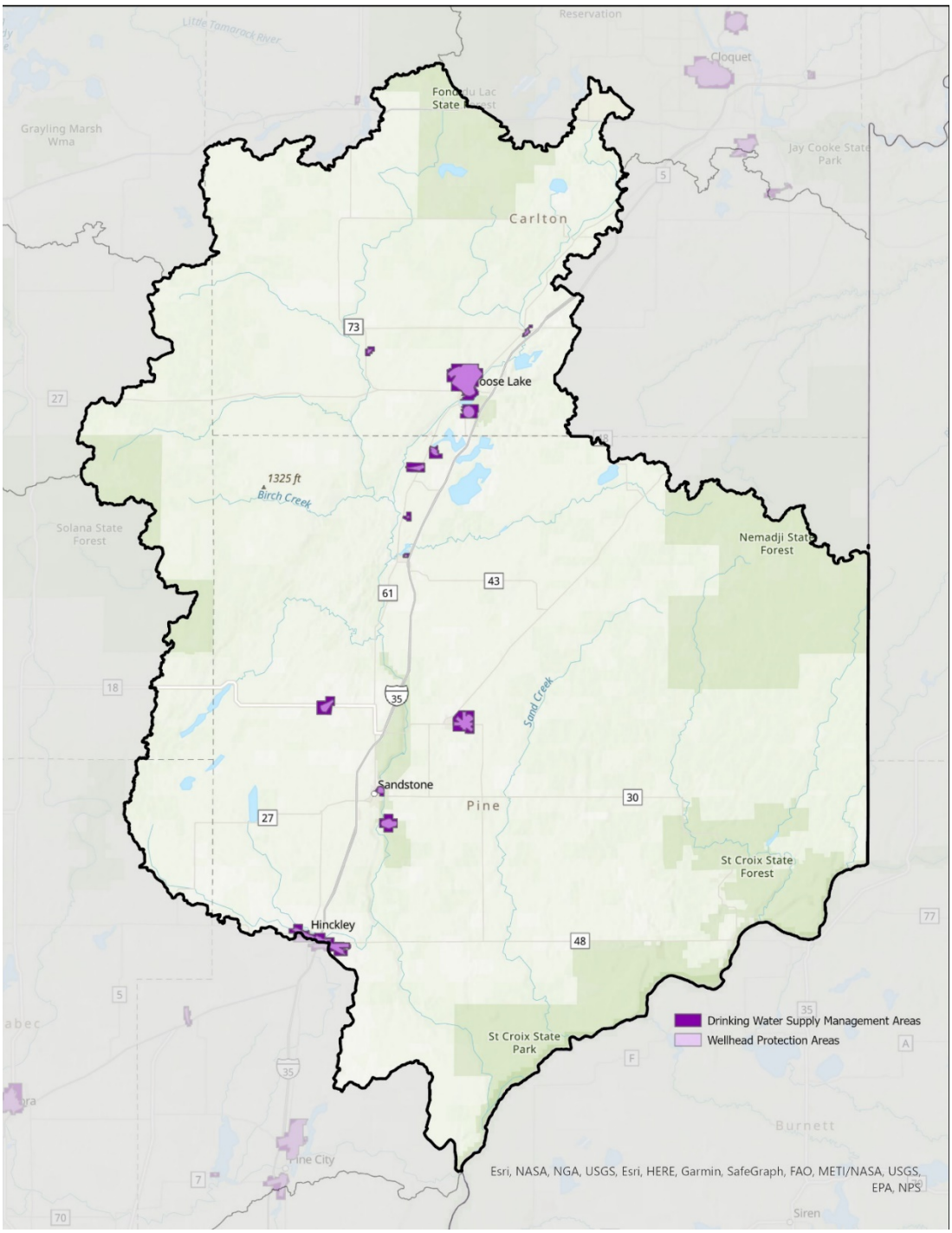

Figure 7. Drinking water supply management and wellhead protection areas identified by the Minnesota Department of health.

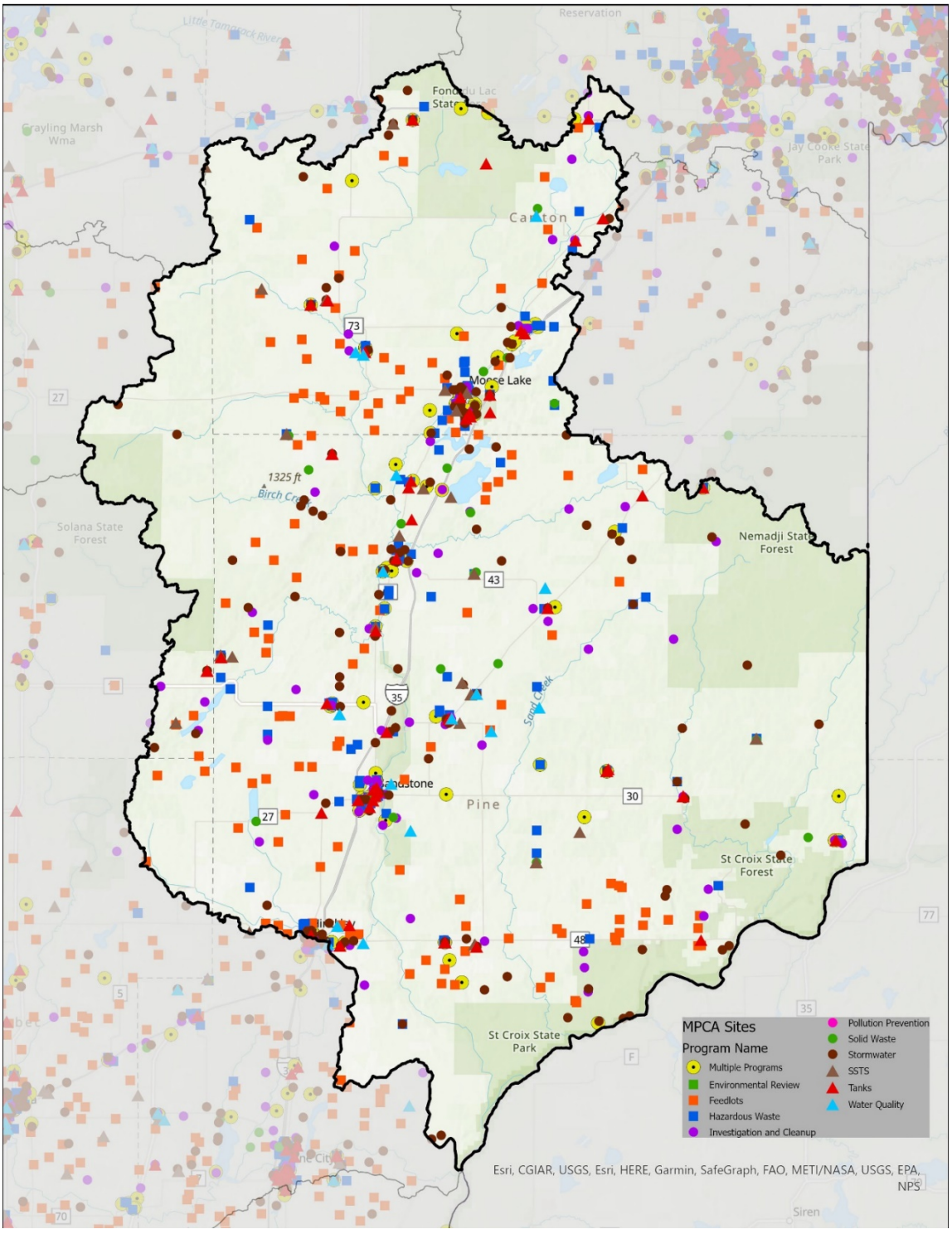

Figure 8. **The MPCA's What's in My Neighborhood contains a wide variety of environmental information including potentially contaminated sites, permits, licenses, registrations, inspections, and closed enforcement activities.**

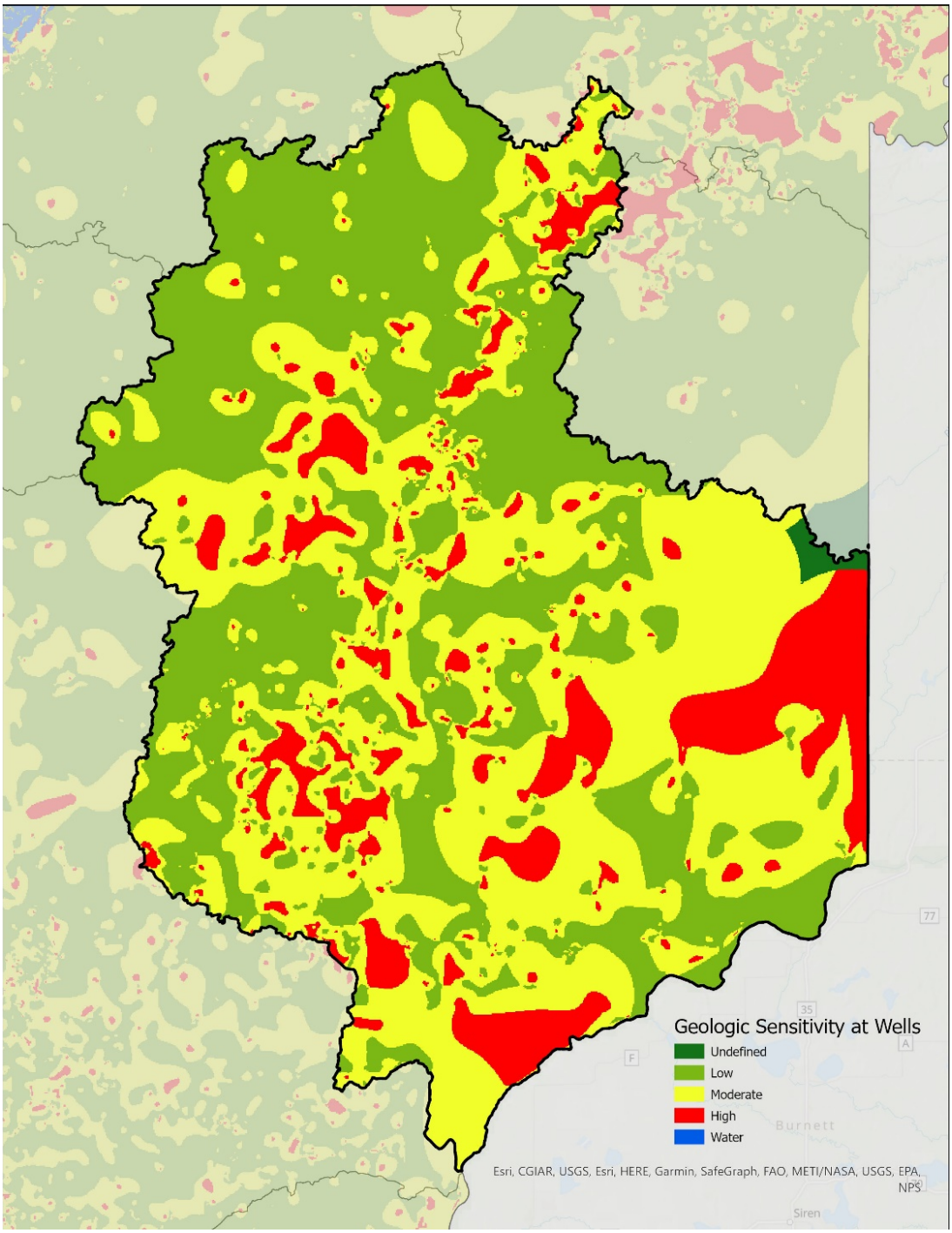

Figure 9. Pollution sensitivity (also known as aquifer vulnerability or geologic sensitivity) refers to the time it takes recharge and contaminants at the ground surface to reach the underlying aquifer. This raster layer was created by calculating the sensitivity at individual wells and then interpolating between them to create a smooth layer. The wells used to make this figure vary in depth but overall provide a picture of the geologic sensitivity of aquifers below the water table.

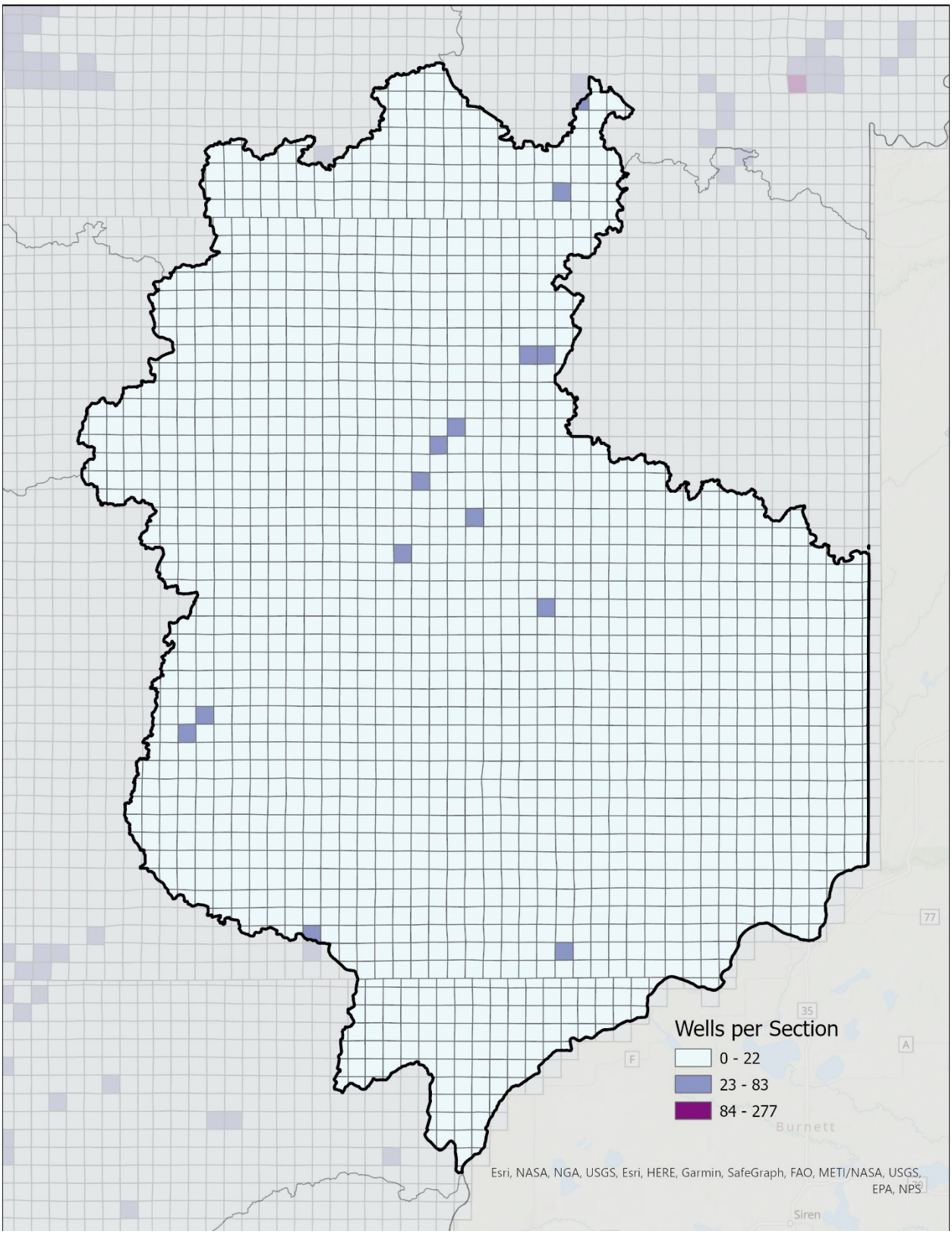

Figure 10. Drinking water wells (as defined in the Minnesota County Well Index) within each Public Land Survey section.

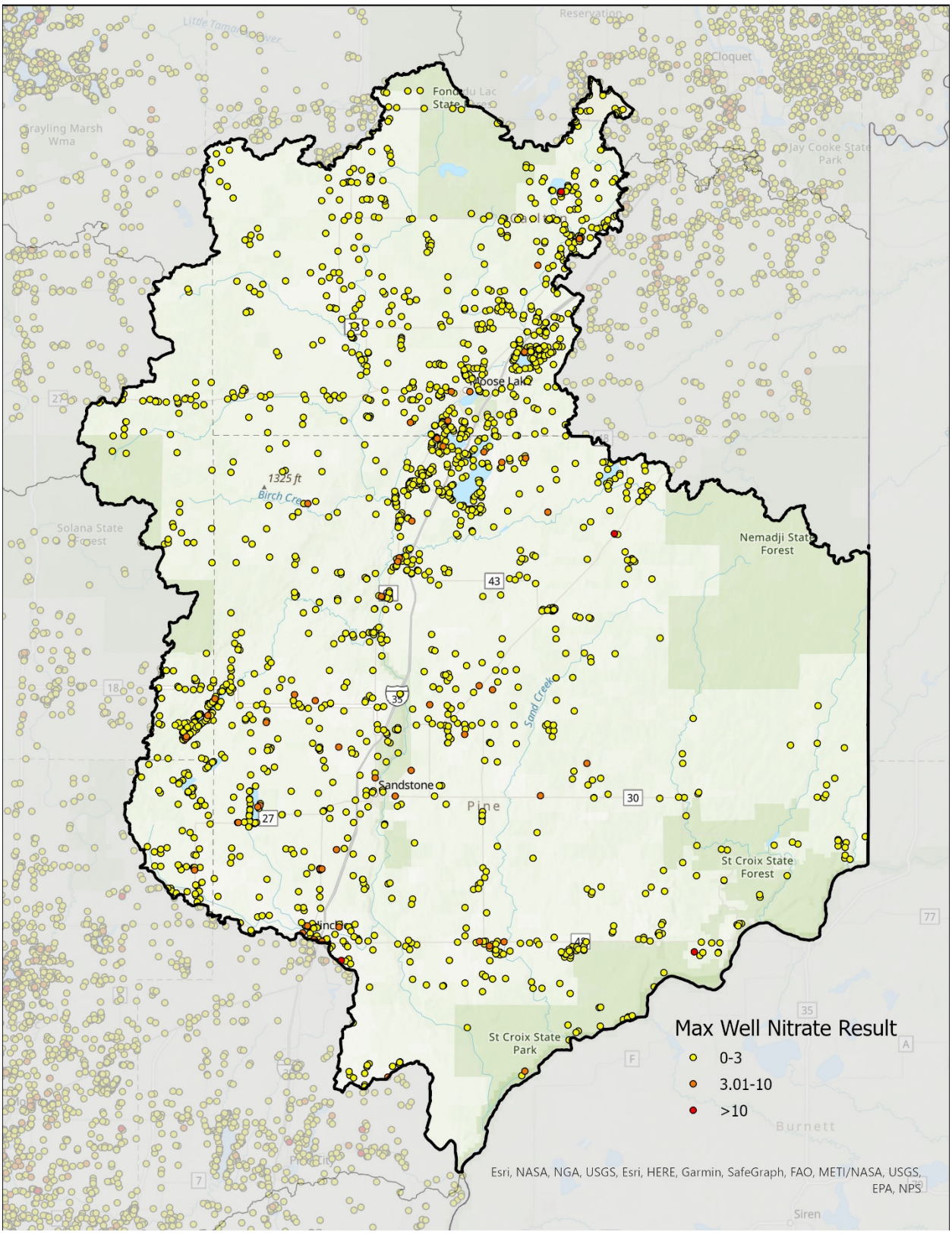

Figure 11. Nitrate sample result (mg/L) for wells in the Minnesota County Well Index. Only wells with known Nitrate sample results are included.

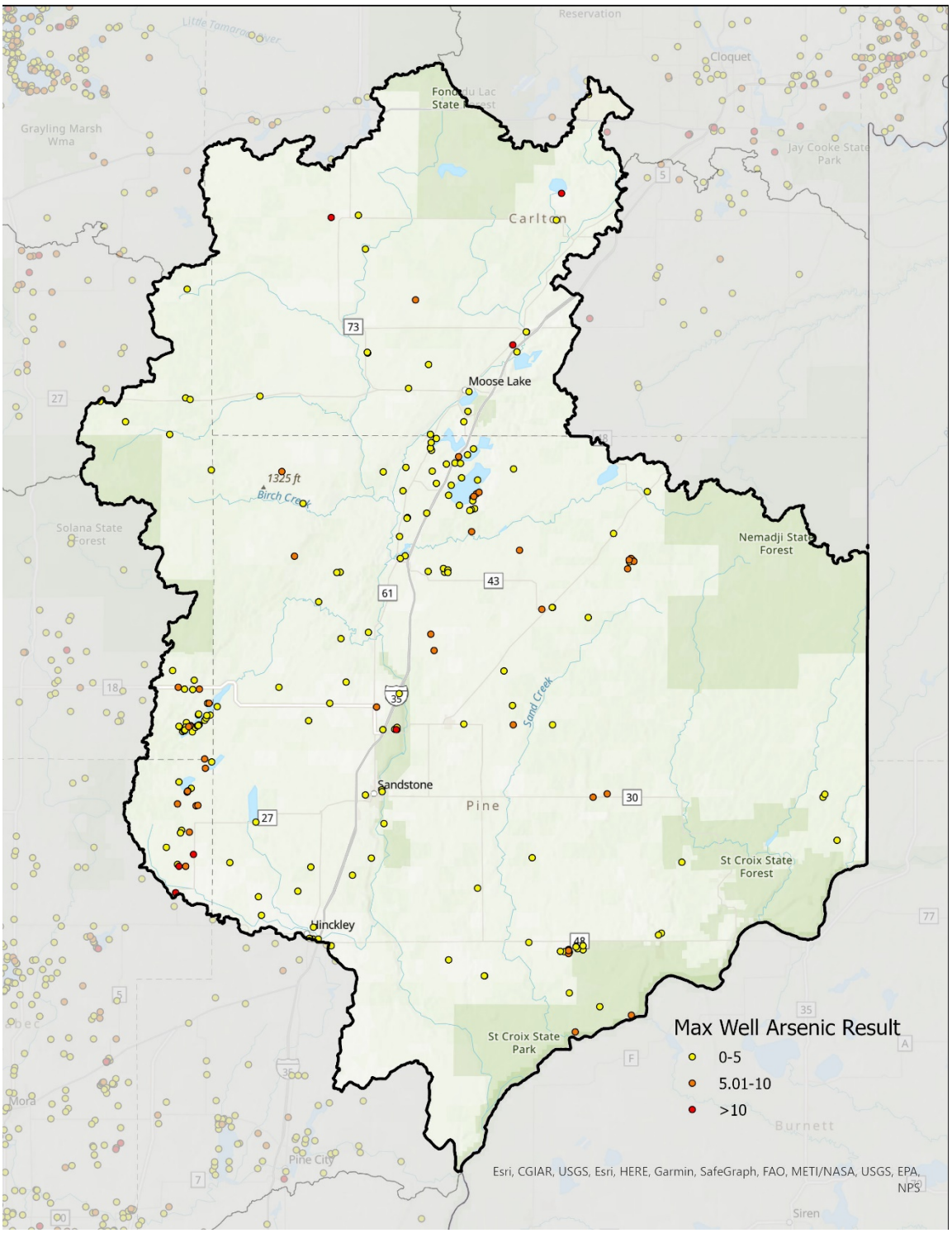

Figure 12. The maximum recorded Arsenic sample result (ug/L) for wells in the Minnesota County Well Index. Only wells with known Arsenic sample results are included. Unique well numbers are not included in this layer.